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10/550,755

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EXAMINER

ANWAR, MOHAMMAD S

ART UNIT

PAPER NUMBER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/550,755

Applicant(s)

BAUGHAN ET AL.

Examiner

MOHAMMAD ANWAR

Art Unit

4125

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2006.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☐ Claim(s) 1-22 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 23 September 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 10550755.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SI/08)
Paper No(s)/Mail Date 9/23/05
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to because Figures 1 through 41 should have proper descriptive legends such as N (Node), L (non-planar link). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled

"Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claims 11, 13, 17-20 are objected to because of the following informalities:

In claim 11 line 2 recites "a link" which seems to refer to "links" in claim 1 line 6. If this is true, it is suggested to change "a link" to ----the link----.

In claim 11 line 2 recites "two virtual nodes" which seems to refer to "two or more virtual nodes" in claim 1 line 16. If this is true, it is suggested to change "two virtual nodes" to ----the two virtual nodes----.

In claim 13 line 1 recites "a non-planar link" which seems to refer to "one or more non-planar links" in claim 12 line 2. If this is true, it is suggested to change "a non-planar link" to ---the non-planar link----.

In claim 17 line 6 recites "a network level" which seems to refer to "a network level" in claim 14 line 27. If this is true, it is suggested to change "a network level" to ---the network level---.

In claim 17 line 7 recites "a single path" which seems to refer to "a single path" in claim 14 line 28. If this is true, it is suggested to change "a single path" to ---the single path---.

Claims 18-20 are objected because they are dependent on claim 17.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1 line 16 recites "the previous network level" which lacks antecedent basis. Similar problem exists in claim 1 line 18, 20 and 27, claim 14 line 19, 21, 23, and 30.

In claim 14 line 25 recites "said first physical node" which lacks antecedent basis. Similar problem exists in claim 14 lines 27, 29 and 31.

In claim 17 line 5 recites "the required node" which lacks antecedent basis. Similar problem exists in line 6.

Claims 2-13 are rejected because they are dependent on claim 1. Claims 15, 16, 18-22 are rejected because they are dependent on claim 14.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 2, 9-14, 16, 21, 22 are rejected under 35 U.S.C. 102(b) as being unpatentable by Suzuki (4884263).

For claim 1, Suzuki discloses a method of generating a routing table of destinations for a first physical node of a data communication network which network consists of a plurality of nodes (see Figure 1, column 3 lines 11-15), links interconnecting the nodes and a plurality of destinations associated with respective nodes (see Figure 1, column 3 lines 11-15), comprising the steps of: collecting topological information on at least a part of the data communication network in terms of physical nodes and links between physical nodes (See Figure 4, column 4 lines 25-32); embedding the collected topological information in a plane corresponding to a first network level (see Figure 1, col 4 lines 35-49); identifying one or more closed loops of interconnected nodes lying in the plane of the network level (See Figure 1, column 3 lines 15-20); for a first further network level (see Figures 1, 6 and 12), assigning a virtual node for each closed loop of interconnected nodes in the previous network level (see Figure 12, column 3 lines 27-32), each virtual node being representative at the further network level of the nodes of the corresponding closed loop in the previous network level and any destinations associated with those nodes (see Figures 6, 7 and 12); identifying links between the virtual nodes (see figure 8, 9, column 7 lines 25-26, column 7 lines 51-55), the links corresponding to nodes in the previous network level that are common to two or more virtual nodes in the further network level (see Figures 7 and 10, column 7 lines 31-43) ; whereby the route between the first

physical node and a destination associated with a further physical node of the data communication network is defined in relation to a network level at which the first physical node and the further physical node are interconnected by a single path (see Figure 6, column 6 line 54-60); and populating the routing table of the first physical node for each destination with the set of paths that belong to the previous network level corresponding to the single path at the network level at which the first physical node and the destination are interconnected (see column 5 lines 35-63).

For claim 2, Suzuki discloses wherein the closed loops comprise a collection of nodes in which each node is connected to itself via at least one other node using the smallest number of nodes (see Figures 1, and 6. column 3 lines 11-20, column 6 lines 30-61), excluding nodes that are only connected to other nodes within the closed loop (See Figure 12 column 9 lines 26-33).

For claim 9, Suzuki discloses wherein topological information on all nodes and links of the data communication network is collected (see column 4 lines 25-65).

For claim 10, Suzuki discloses wherein host information and their destination addresses are also collected (see column 4 lines 25-65).

For claim 11, Suzuki discloses herein a link between two virtual nodes in a further network level is only identified where there is a minimum of two nodes common to their corresponding closed loops in the preceding network level (see Figure 11, column 8 lines 47-67).

For claim 12, Suzuki discloses wherein one or more non-planar links at the first network level are omitted (see Figure 11, column 8 lines 47-67).

For claim 13, Suzuki discloses wherein a non-planar link omitted from the first network level is embedded at a further network level at which the link can be added whilst preserving the planarity of the further network level (see column 6 lines 30-67, column 7 lines 1-50).

For claim 14 & 21, Suzuki disclose A network node suitable for use in a data communication network which network consists of a plurality of nodes (see Figure 1, column 3 lines 11-15), links interconnecting the nodes and a plurality of destinations associated with respective nodes (see Figure 1, column 3 lines 11-15), the network node comprising: an input/output interface for data input to and output from the network node (see column 4 lines 39-40); data storage adapted to store a routing table (see column 4 lines 12-16, column 4 lines 37-38); a processor for populating the routing table (see column 4 lines 12-16); a selector for selecting a path across the data communication network to a destination on the basis of information contained in the routing table (see column 4 lines 25-65); and program storage means in which is stored a set of instructions for populating the routing table (see column 4 lines 12-16), the set of instructions comprising instructions for:

a) collecting topological information on at least a part of the data communication network in terms of physical nodes and links between physical nodes (See Figure 4, column 4 lines 25-32);

b) embedding the collected topological information in a plane corresponding to a first network level (see Figure 1, col 4 lines 35-49);

c) identifying one or more closed loops of interconnected nodes lying in the plane of the network level (See Figure 1, column 3 lines 15-20);

d) for a first further network level (see Figures 1, 6 and 12), assigning a virtual node for each closed loop of interconnected nodes in the previous network level (see Figure 12, column 3 lines 27-32), each virtual node being representative at the further network level of the nodes of the corresponding closed loop in the previous network level and any destinations associated with those nodes (see Figures 6, 7 and 12);

e) identifying links between said virtual nodes, the links corresponding to nodes in the previous network level that are common to two or more virtual nodes in the further network level (see figure 8, 9, column 7 lines 25-26, column 7 lines 51-55); whereby the route between said first physical node and a destination associated with a further physical node of the data communication network is defined in relation to a network level at which said first physical node and the further physical node are interconnected by a single path (see Figure 6, column 6 line 54-60); and

f) populating the routing table of the first physical node for each destination with the set of paths that belong to the previous network level corresponding to the single path at the network level at which the first physical node and the destination are interconnected (see column 5 lines 35-63).

For claim 16, Suzuki discloses wherein said program storage means further includes instructions for updating the routing table on the basis of information communicated across the data communication network (see column 5 lines 39-42).

For claim 22, Suzuki discloses wherein the interconnecting links may be selected from wire links, fibre optic links, infrared links and wireless links or a combination thereof (see column 4 lines 1-4).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Alfonsi et al. (5491690).

For claim 3, Suzuki discloses all the subject matter but fails to mention wherein the collected topological information is used to generate a subnetwork and wherein the subnetwork is embedded in the plane corresponding to the first network level to produce a planar embedded graph from which faces are identified corresponding to the closed loops. However, Alfonsi et al. from a similar endeavor disclose wherein the collected topological information is used to generate a subnetwork and wherein the subnetwork is embedded in the plane corresponding to the first network level to produce a planar embedded graph from which faces are identified corresponding to the closed loops (See Figure 9, column 3 lines 57-67, column 4 lines 1-13). Thus, it would have been obvious to one ordinary skill in the art at the time of invention was made to include Alfonsi et al. subnetwork scheme into Suzuki routing scheme. The method can be implemented in the hardware and software. The motivation of doing this is to have smaller routing tables and hence less storage and processing as well as less communication overhead.

12. Claims 4-6 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Suzuki in view of James et al. (6584539).

For claims 4 & 5, Suzuki discloses all the subject matter but fails to mention wherein at least steps c) to e) are repeated cyclically for further virtual network levels. However, James et al. from a similar field of endeavor disclose wherein at least steps c) to e) are repeated cyclically for further virtual network levels (see column 6 lines 12-17). Thus, it would have been obvious to one ordinary skill in the art at the time of invention was made to include James et al. cyclical scheme into Suzuki routing scheme. The method can be implemented in the hardware and software. The motivation of doing this is to have efficient routing and avoid deadlocks.

For claim 6, Suzuki discloses all the subject matter but fails to mention wherein step f) of populating the routing table is repeated for each further network level. However, James et al. from a similar field of endeavor disclose wherein step f) of populating the routing table is repeated for each further network level (see column 10 lines 38-48). Thus, it would have been obvious to one ordinary skill in the art at the time of invention was made to include James et al. cyclical scheme into Suzuki routing scheme. The method can be implemented in the hardware and software. The motivation of doing this is to have efficient routing and avoid deadlocks.

13. Claims 7, 8, and 17-20 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Suzuki in view of James et al. (6584539) and further in view of Thorson et al. (5701416).

For claim 7, Suzuki disclose all the subject matter but fails to mention wherein at least steps c) to e) are repeated cyclically until the part of the data communication network has been simplified at a virtual network level to a wholly deterministic structure.

However, James et al. from a similar field of endeavor disclose wherein at least steps c) to e) are repeated cyclically (see column 6 lines 12-17). Thus, it would have been obvious to one ordinary skill in the art at the time of invention was made to include James et al. cyclical scheme into Suzuki routing scheme. The method can be implemented in the hardware and software. The motivation of doing this is to have efficient routing and avoid deadlocks. Suzuki and James et al. disclose all the subject matter but fails to mention until the part of the data communication network has been simplified at a virtual network level to a wholly deterministic structure. However, Thorson et al. from a similar field of endeavor disclose until the part of the data communication network has been simplified at a virtual network level to a wholly deterministic structure. (See column 6 lines 63-66, column 11 lines 45-48). Thus, it would have been obvious to one ordinary skill in the art at the time of invention was made to include Thorson et al. deterministic routing scheme into Suzuki routing scheme and James et al. cyclical scheme. The method can be implemented in the hardware and software. The motivation of doing this is to have efficient routing and avoid deadlocks.

For claim 8, Suzuki and James et al. disclose all the subject matter but fails to mention wherein a selected sector of the data communication network is assigned superiority with respect to a further sector of the data communication network and repetition of at least steps c) to e) is halted when a deterministic link is identified between the selected sector and the further sector of the data communication network. However, Thorson et al. from a similar field of endeavor disclose wherein a selected sector of the data communication network is assigned superiority with respect

to a further sector of the data communication network and repetition of at least steps c) to e) is halted when a deterministic link is identified between the selected sector and the further sector of the data communication network (see column 7 lines 16-22). Thus, it would have been obvious to one ordinary skill in the art at the time of invention was made to include Thorson et al. priority scheme into Suzuki routing scheme & James et al. cyclical scheme. The method can be implemented in the software. The motivation of doing this is to have efficient routing and avoid deadlocks.

For claim 17, Suzuki discloses the method comprising the steps of: when data to be transmitted to a destination on the data communication network is input to the network node (see column 1 lines 54-62), the selector accesses the routing table to identify the route for the required node associated with the destination of the data (see column 4 lines 25-32); where the required node is linked at a network level to the network node by a single path (see Figure 6). Suzuki discloses all the subject matter but fails to mention the selector determines a direction of circulation of the data around the underlying closed loops at each previous level in which the network node participates in order to achieve deterministic routing of the data across the network. However, Thorson et al. from a similar field of endeavor disclose the selector determines a direction of circulation of the data around the underlying closed loops at each previous level in which the network node participates in order to achieve deterministic routing of the data across the network (see column 7 lines 16-22). Thus, it would have been obvious to one ordinary skill in the art at the time of invention was made to include Thorson et al. priority scheme into Suzuki routing scheme & James et al. cyclical scheme. The method

can be implemented in the software. The motivation of doing this is to have efficient routing and avoid deadlocks.

For claim 18, Suzuki and Thorson et al. disclose all the subject matter but fails to mention wherein a path for the destination of input data is adaptively selected with respect to a closed loop at a particular network level, based on available information on the network state at that level. However, James et al. from a similar field of endeavor disclose wherein a path for the destination of input data is adaptively selected with respect to a closed loop at a particular network level, based on available information on the network state at that level (see column 3 lines 22-67, column 4 lines 1-6). Thus, it would have been obvious to one ordinary skill in the art at the time of invention was made to include James et al. adaptive routing scheme into Suzuki routing scheme & Thorson et al. priority scheme. The method can be implemented in the hardware and software. The motivation of doing this is to increase throughput and lower the sensitivity of the network to variations in communication patterns.

For claim 19, Suzuki discloses wherein the routing table of the network node is updated at predetermined intervals to reflect the network state at each network level (see column 5 lines 39-67, column 6 lines 1-14).

For claim 20, Suzuki discloses wherein address and network performance information are distributed at each network level with the nodes themselves as the destinations (see column 6 lines 15-26).

14. Claim 15 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Suzuki in view of Lidinsky et al. (4922486).

For claim 15, Suzuki discloses all the subject matter but fails to mention wherein the selector comprises a switch fabric. However, Lidinsky et al. from a similar field of endeavor disclose wherein the selector comprises a switch fabric (see column 10 lines 47-49). Thus, it would have been obvious to one ordinary skill in the art at the time of invention was made to include Lidinsky et al. switching fabric scheme into Suzuki routing scheme. The method can be implemented in the hardware. The motivation of doing this is to have efficient routing.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Weinstein et al. (6977937) and Larson (20020051425).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MOHAMMAD ANWAR whose telephone number is (571)270-5641. The examiner can normally be reached on Monday-Thursday, 9am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dang Ton can be reached on 571-272-3171. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 4125

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MOHAMMAD ANWAR
Examiner
Art Unit 4125

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